REMARKS

In response to the Office Action dated March 20, 2003, the following arguments are presented. Claims 1-20 remain in the case. In light of the arguments set forth in this response, reexamination and reconsideration of the application are requested.

Allowable Subject Matter

The Applicant gratefully acknowledges and appreciates the allowance of claims 12-18.

Non-Responsiveness of Office Action dated March 20, 2003

The Applicant finds it difficult to respond to the Office Action dated March 20, 2003, because the Applicant's arguments and evidence submitted in a response filed in response to a previous final Office Action (the response accompanied a Request for Continued Examination (RCE)) have not been considered. In this latest Office Action, the Examiner has rejected claims 1, 2 and 19 based on Sengupta et al.. However, the Applicant submits that the Sengupta et al. reference has been overcome and that each of the pending claims is patentable. Sengupta et al. has been overcome by the submission of a 1.132 declaration and accompanying arguments proffered in the response submitted with the RCE. This latest Office Action provides no information as to whether the 1.132 declaration has been entered into the record and, if not, why it was denied entry. In fact, the latest Office Action makes no mention at all of the 1.132 declaration submitted by the Applicant. It seems that the Applicant's declaration has not even been considered.

In light of this non-consideration, the Applicant offers the arguments below as to why the Office Action dated March 20, 2003 is non-responsive. Based on this non-responsiveness, the Applicant can merely repeat the arguments set forth in previous responses. Accordingly, the Applicant respectfully requests that the next Office Action not be made final since the non-responsive nature of the current Office Action provides little or no new information to which the Applicant can respond.

Upon taking up an application for examination, an Examiner is required to make a "thorough study thereof" and to provide an examination that "shall be complete" (37 C.F.R. §1.104(a)(1) and MPEP §707). An Office Action, which is sent to the Applicant, is the result of this examination. The Applicant is expected to respond in a timely manner to the Office Action. In that response, the Applicant typically sets forth arguments and offers evidence traversing the rejections as contained in the Office Action. The Applicant's response must be fully responsive and meet the objections and rejections of the claims as set forth in the Office Action (MPEP §714.02). The Applicant's response then is submitted to the USPTO for consideration by the Examiner.

When the Examiner takes up the application to review the Applicant's response, the Examiner also has certain requirements that must be met when answering the Applicant's traversal of rejections contained in the previous Office Action. First, the Examiner's response to the Applicant's arguments and evidence proffered "will be complete as to all matters" (37 C.F.R. §1.104(b) and MPEP §707.07, emphasis added). Second, the Examiner must answer all material traversed (MPEP §707.07(f)). Specifically, where the Applicant traverses a rejection, the Examiner "should make proper reference thereto in his or her action on the amendment" (MPEP §707.07(f), emphasis added). "Where the applicant traverses any rejection, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and answer the substance of it" (MPEP §707.07(f), emphasis added).

The above-cited law means that all arguments and evidence proffered by the Applicant in response to the Office Action must be addressed by the Examiner in subsequent Office Actions. In other words, if the Applicant responds with arguments as to why the rejection is wrong and offers evidence in support of this argument, the Examiner is required by law to consider the arguments and the evidence. After consideration, the Examiner must respond to the Applicant's proffered arguments and evidence by either accepting and entering the arguments and evidence into th record

or not entering them and stating the reasons why they were not ent red. It is simply improper for an Examiner to ignore and not even consider an Applicant's proffered arguments and evidence traversing a rejection.

During the prosecution of this application, the Applicant filed a Request for Continued Examination (RCE). In a response that accompanied the RCE filed on December 27, 2002, the Applicant also submitted a declaration under 37 C.F.R. §1.132. In that declaration, the inventor set forth several statements including a statement that the Sengupta et al. patent assume that the camera pose already is known. In the response, the Applicant traverse the rejections set forth in the previous final Office Action by arguing that the Sengupta et al. patent assumes that the camera pose already is known. The Applicant also referenced the declaration in support of this argument. The Applicant used declaration to support the argument that the Applicant's claimed feature of determining a relative position and orientation (a camera pose) is not taught by Sengupta et al., since in Sengupta et al. the camera pose is already known.

The Office Action dated March 20, 2003, was received in response to the Applicant's preliminary response that accompanied the RCE. However, in the 3/20/03 Office Action, the Applicant's arguments were not even considered and no response to those arguments was made. In addition, no mention was made of the 1.132 declaration. Specifically, the 1.132 declaration was not even considered or made of record. This is completely improper. The Examiner is required by law to either consider and enter the arguments and the 1.132 declaration or state the reasons why they were not entered. Either way, the Office Action must be fully responsive in recognizing and considering the Applicant's proffered arguments and 1.132 declaration.

The 3/20/03 Office Action was not fully responsive. The Applicant, therefore, requests that the Office Action be relssued that is fully responsive to each argument set forth and that considers the 1.132 declaration previously submitted during the course of prosecution.

As stated above, the Office Action dated March 20, 2003, was non-responsive in that it did not consider and respond to the Applicant's arguments and the 1.132 declaration presented in a preliminary response filed with the RCE. However, in an effort to further the prosecution of this case, the Applicant offers the following response to the Office Action.

Claim Objections

The Office objected to claims 3-11 and 20 as being dependent on a rejected base claim. However, the Office Action stated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response, the Applicant notes that the base claim for claims 3-11 is independent claim 1 and the base claim for claim 20 is independent claim 19. As argued below, both claims 1 and 19 are patentable over the prior art.

Section 102(e) Rejections

The Office Action rejected claims 1, 2 and 19 under 35 U.S.C. § 102(b) as being anticipated by Sengupta et al. (U.S. Patent No. 6,359,647). The Office Action stated that Sengupta et al. discloses each and every element of the Applicant's claimed invention.

In response, the Applicant respectfully traverses these rejections based on the following legal and technical analysis. In addition, these arguments are supported by the attached declaration under 37 C.F.R. §1.132 of John C. Krumm.

In general, the Applicant submits that Sengupta et al. lacks at least one feature of the Applicant's claimed invention. In particular, Sengupta et al. do not disclose, either explicitly or implicitly, the material claimed feature of calculating transformation parameters based on the object path to compute a camera pose.

Independent Claim 1

Independent claim 1 of the Applicant's claimed invention includes a method of determining a relative position and orientation (i.e., a camera pose) between a base camera and a non-base camera. This relative position and orientation between a base camera and a non-base camera is the geometric calibration for each camera that determines the camera (or relative) pose. The method includes measuring a path of an object with the base camera, in a base coordinate frame, and measuring the object path with the non-base camera in a non-base coordinate frame. The method further includes calculating transformation parameters based on the object path and applying the transformation parameters to the object path measure with the non-base camera. The transformation parameters are applied such that the object path measured by the non-base camera (in the non-base coordinate frame) is expressed in the base coordinate frame. This base coordinate frame is the coordinate frame of the base camera.

In contrast, Sengupta et al., do not disclose the Applicant's claimed feature of calculating transformation parameters based on the object path to compute a camera pose. In fact, Sengupta et al. merely disclose a system that presupposes and assumes that the cameras contained in the system are already calibrated and that the camera pose is already known. This position of the Applicant is supported by the attached declaration under 37 C.F.R. §1.132 of John C. Krumm. Specifically, in the attached declaration Mr. Krumm states that [t]he system of Sengupta et al. presuppose that the cameras used therein are calibrated. In other words, Sengupta et al. assume that the camera pose or geometric calibration (the location and angle) of each camera is already known."

More specifically, Sengupta et al. discuss a multi-camera security system that comprises multiple video cameras (col. 3, lines 8-10). These cameras are positioned at different locations around a room (FIG. 1; col. 3, lines 10-15). The system and multiple video cameras are used to determine and track an object as the "object traverses from one camera's field of view to another camera's field of view" (col. 3, lines 54-65). In order to determine a precise location of an object along a camera's line of sight, a ranging technique may be employed (col. 6, lines 14-16). Once the object's location (P in FIG. 5C) is determined, "the cameras within whose field of view the location P lies can be

determined" (col. 7, lines 14-15). "This is because th cameras' fields of view are modeled in this same coordinate system" (col. 7, lines 16-17; emphasis added). In other words, the camera pose for each camera is already known.

Throughout the patent of Sengupta et al. there are passages that state a presupposed knowledge of the position and orientation (i.e., camera pose) of each camera. For example, the "field of view determinator 150 determines the field of view of each camera based upon its location and orientation" (col. 3, lines 38-39; emphasis added). The "approximate physical location of a figure is determined from the displayed image, the identification of the figure within this image by the figure tracking system, and a knowledge of the camera's location and actual field of view which is producing the displayed image" (col. 2, lines 4-8; emphasis added).

All of the above passages point to the fact that in Sengupta et al. the camera pose of each camera is already known. In fact, the "orientation of the camera, in the physical coordinate space, is determined when the camera is initially installed" (col. 9, lines 19-21; emphasis added). This data is stored in "a database 160 that describes the secured area and the location of each camera" (col. 3, lines 43-46; emphasis added). Sengupta et al. do not discuss how the camera pose is determined when each camera is initially installed, only that some calibration has occurred and that the results of that calibration are stored in a database. Thus, while the Applicant's claim a method for computing a camera pose by calculating transformation parameters, Sengupta et al. disclose a system that depends on the camera pose (camera location and orientation) being known. This position of the Applicant is supported by the attached declaration under 37 C.F.R. §1.132 of John C. Krumm.

The Office Action (dated August 27, 2002) maintains that FIGS. 6A and 6B of Sengupta et al. disclose the Applicant's claimed feature of calculating transformation parameters based on an object path. However, a careful reading of Sengupta et al. reveals that FIG. 6A and 6B do not disclose calculating transformation parameters based on an object path. In fact, FIG. 6A of Sengupta et al. merely discusses

determining a location of a target in a room. This location is det rmined along a camera's line of sight (LOS) either by ranging or interpolation (col. 9, lines 29-31). Once the location of the target along the line of sight is determined, the target's location in the room is determined. For ranging, this location is at the point along the LOS at a distance R from the camera's location (col. 9, lines 33-16). For interpolation, this location is at an intersection point of a first camera's line of sight (LOS1) and a second camera's line of sight (LOS2). Unlike the Applicant's claimed invention, however, nowhere are transformation parameters calculated based on an object path because the camera pose for each camera is already known.

FIG. 6B of Sengupta et al. merely discusses identifying and selecting a camera such that the target is contained within the selected camera's field of view (col. 9, lines 52-57). This "process merely comprises a determination of whether point P lies within the polygon or polyhedron" associated with each camera (col. 9, lines 59-61). Nowhere do Sengupta et al. discuss calculating transformation parameters based on an object path because the camera pose for each camera is already known.

Accordingly, the Applicant respectfully submits that Sengupta et al. lack this claimed feature of independent claim 1 of. Thus, the rejection of c

The Applicant, therefore, respectfully traverses this rejection of independent claim 1 because Sengupta et al. do not disclose, either explicitly or implicitly, the material claimed feature of calculating transformation parameters based on the object path to compute a camera pose. Because of this missing feature, the §102 rejection cannot stand.

Independent Claim 19

Independent claim 19 includes a method of calibrating a first and a second range camera. The method includes measuring a path of an object with the first range camera to generate a first observed object path and measuring th object path with the second range camera to generate a second observed object path. The method also includes

calculating a transformation parameter that causes the first observed object path to approximately overlap with the second observed object path so as to determine a relative pose between the first and second range cameras. As discussed above, Sengupta et al. do not discuss a transformation parameter that determines a relative (or camera) pose.

The Applicant, therefore, respectfully traverses this rejection of independent claim 19 because Sengupta et al. do not disclose, either explicitly or implicitly, the material claimed feature of calculating a transformation parameter that causes the first observed object path to approximately overlap with the second observed object path so as to determine a relative pose between the first and second range cameras. Because of this missing feature, the §102 rejection cannot stand.

Because the Applicant's claimed invention includes features neither taught, disclosed nor suggested by Sengupta et al., the Applicant respectfully submits that the rejections of independent claims 1 and19 under 35 U.S.C. § 102(e) as being anticipated by Sengupta et al. has been overcome based on the arguments set forth above and below and the attached declaration under 37 C.F.R. §1.132 of John C. Krumm. Moreover, rejected claim 2 as well as claims 3-11 depend from independent claim 1 and claim 20 depends from independent claim 19 and therefore also are novel over Sengupta et al. (MPEP § 2143.03). The Applicant, therefore, respectfully requests reexamination, reconsideration and withdrawal of the rejection of claims 1, 2 and 19 under 35 U.S.C. § 102(e) as being anticipated by Sengupta et al. based on the arguments above and the attached declaration under 37 C.F.R. §1.132 of John C. Krumm. In addition, the Applicant respectfully requests reexamination, reconsideration of claims 3-11 and 20.

Conclusion

In view of the arguments set forth above and the attached declaration under 37 C.F.R. §1.132 of John C. Krumm, the Applicant submits that claims 1-11, 19 and 20 of the subject application ar in immediate condition for allowance. Th Examiner,

therefore, is respectfully requested to withdraw the outstanding rejections of the claims and to pass all of the claims of this application to issue.

In an effort to expedite and further the prosecution of the subject application, the Applicant kindly invites the Examiner to telephone the Applicant's attorney at (805) 278-8855 if the Examiner has any comments, questions or concerns, wishes to discuss any aspect of the prosecution of this application, or desires any degree of clarification of this response.

Respectfully submitted,
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